Malingering on subjective complaint tasks: an exploration of the deterrent effects of warning.

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Abstract

Assessing patient's subjective experience of illness is an important component of neuropsychological assessment. This information can be assessed using standardised self-report complaint (SRC) checklists and may have specific applications in the assessment of malingering. Previous research suggests that subjective complaints can be faked under some circumstances, however the extent to which this occurs when assessments are made using standardised SRC measures is less well understood. In addition, if complaints can be faked this raises the question: what might reduce the likelihood of faked symptom reports? In this study, we randomly allocated 60 first-year undergraduate subjects to one of three conditions: malingering, malinger-with-warning, and control. Using a repeated measures analogue design, we assessed differences between groups on selected SRC measures. The measures used were the Neuropsychological Symptom Checklist, the General Health Questionnaire-30, and the Depression, Anxiety, and Stress Scales. We expected to find SRC measures would be vulnerable to faking, but also that warning malingerers about the possibility of detection would reduce faking behaviour. Further, control group scores on SRC measures were calculated to produce preliminary complaint base rate data for these tests. Our results showed SRC measures were vulnerable to faking. In addition, contrary to expectations, we found warnings did not significantly deter malingering, although we observed a trend in the expected direction and future studies with a larger sample size or a modified warning may be needed to further investigate warning efficacy. Broader implications of these findings are discussed in light of deterrence theory and recent debate over the use of SRC measures in the assessment of malingering.

Malingering on subjective complaint tasks: an exploration of the deterrent effects of warning.

The extent to which tests of ability such as memory can be faked has been the focus of much research in neuropsychology (Gouvier, Hayes, & Smiroldo, 1998; Haines & Norris, 1995; Kropp & Rogers, 1993; Rogers, Harrell, & Liff, 1993; Vickery, Berry, Hanlon Inman, Harris, & Orey, 2001). These studies have attempted to assess the vulnerability of various objective measures of ability to malingering or symptom exaggeration (e.g., van Gorp et al., 1999). However, few studies have explored the vulnerability of measures of self-reported complaint to malingering, even though these measures may also be used as part of neuropsychological assessment and generate information that may be used for a range of important clinical decisions. For example, information about self-reported complaints may be used to inform decisions about which tests of ability should be administered (Lezak, 1995), and may contribute to the formulation of clinical impressions and diagnoses (Gouvier, Cubic, Jones, Brantley, & Cutlip, 1992; Lees-Haley & Brown, 1993; Loring, 1995). In addition, self-reported complaint data may have a specific role facilitating the detection of malingering, for instance, through identification of inconsistent symptom-injury or complaint-performance relationships. This raises an interesting question about the extent to which measures of subjective complaint can be faked and whether there are ways of reducing faked symptom-reports.

To establish the importance of understanding how malingerers behave on measures of self-reported complaint, it is important to consider how this information might be used to detect malingering. Indeed, the question of whether and how subjective complaint information might be used to assist clinicians to detect malingering is a matter of some debate. Although Loring (1995) has argued self-reported complaint data is not likely to help clinicians discriminate between malingering and genuine head-injured persons, others have suggested that such information can help identify fakers (e.g., Sbordone, Seyranian, & Ruff,

2000). There are at least two main arguments put forward by those who favour the use of subjective complaint data as an aid to the detection of malingering. First, it has been suggested this information can be used to identify suspicious patterns of complaint such as, indiscriminate symptom endorsement, blatant symptom admission, inconsistent symptom-report over time, endorsement of improbable symptoms either overall (e.g., difficulty seeing green shapes only), or in the context of the presenting problem (e.g., reporting being completely paralysed in one leg after a mild concussive episode; Kropp & Rogers, 1993). In these examples, it is argued that analysis of subjective complaint data itself may be used as an indicator of possible malingering.

The second reason given in support of using subjective complaint data in assessments of malingering is that this information may be used in conjunction with objective test data to corroborate test findings and identify discrepancies between reported symptoms and performance on objective tasks (Sbordone et al., 2000). Indeed, it is the combined use of objective and subjective data, rather than the interpretation of any single test in isolation, that has been suggested as providing the most appropriate basis from which to make an inference of probable malingering (Loring, 1995).

Amongst those who argue against the use of subjective complaint information to detect malingering, at least three main concerns have been raised. These are the "base rate" concern, the problem associated with "causation", and the vulnerability issue. The first concern is that base rates for symptoms associated with head injury among non head-injured persons are relatively high, and as such this information has relatively little diagnostic utility (Gouvier, Uddo-Crane, & Brown, 1998; Loring, 1995). For example, when symptom-report rates have been compared across various groups, several studies have failed to show differences in the number and type of symptoms reported by personal injury claimants and head-injured patients (Lees-Haley & Brown, 1993), head-injured patients and controls (e.g.,

Gouvier, Uddo-Crane, et al., 1988), or simulator-malingerers and head-injured patients (Martin, Hayes, & Gouvier, 1996). When differences in symptom report rates are found, these tend to depend on injury severity in genuinely head injured patients. For instance, less severely head injured patients typically report more symptoms than more severely injured patients, casting doubt on the validity of subjective complaint information (Gouvier et al., 1992; Nadolne, Hoffman, Tremont, Scott, & Adams, 1997; Sbordone et al., 1999). Indeed, the lack of base rate data on measures of subjective complaint is one of the major interpretative obstacles associated with use of information of this type in clinical settings (Gouvier et al., 1998; Wong et al., 1994).

Second, self-reported complaint data may not improve diagnostic accuracy when attempting to identify malingerers because the type of symptoms typical in mild head injury overlap considerably with symptoms plausible in the context of additional stress induced by the process of pursuing compensation or undergoing investigation (Loring, 1995). That is, litigating clients with no history of brain injury describe symptoms similar to those reported by clients with mild brain impairment, such as headaches and fatigue, raising the possibility that the process of seeking compensation may account for elevated symptom reports.

The third reason given for suggesting that subjective complaint data may not assist clinicians in detecting malingering is that knowledge of symptoms likely to follow from head injury among the general population is reasonably high (Lees-Haley & Dunn, 1994; Mittenberg, DiGiulio, Perrin, & Bass, 1992), although this depends to some extent on whether knowledge of physical, cognitive, or emotional sequelae is assessed, and whether symptom severity is investigated (Aubrey, Dobbs, & Rule, 1988; Gouvier, Prestholdt, & Warner, 1988; Willer, Johnson, Rempel, & Linn, 1993). For example, Lees-Haley and Dunn (1994) showed that over half of a sample of naïve subjects correctly identified at least five out of ten post-concussive symptoms, suggesting that malingerers wishing to simulate such

deficits probably know which symptoms to endorse. Overall, the results of studies examining symptom report rates among naïve or uncoached malingerers suggest that complaints can be faked, although few if any of these studies, used standardised or published self-report complaint checklists to assess symptom report, and as such the extent to which similar levels of symptom report would be obtained on such measures remains to be determined. In addition, these studies primarily assessed symptoms related to head injury, possibly limiting opportunities to assess symptom inconsistency and other symptom-based indicators of possible malingering, described previously. For example, Lees-Haley and Dunn (1994) used a checklist that contained 10-items only, all related to mild brain injury. A broader symptom assessment may provide for a more realistic and comprehensive basis from which to examine complaint-reporting behaviour.

There has been one previous study that has explored complaint base rates on standardised symptom report inventories (Wong et al., 1994). In the study by Wong and colleagues (1994), four self-report measures were administered to 279 introductory psychology students under one of three conditions: control, simulator with-, and simulator without-prospect of financial gain. The measures used were the Iowa Interview for Partial Seizure-Like Symptoms, Postconcussion checklist, Postconcussion Syndrome Checklist, and the Beck Depression Inventory. Results showed that self-report checklists used in the Wong et al. study could be faked. That is, students allocated to both malingering conditions reported significantly more symptoms than controls on all four measures. The findings of Wong and colleagues have yet to be replicated, and the extent to which their results generalise to other symptom report inventories remains unknown. Therefore, in this study three different symptom report inventories assessing a wider range of symptoms than those used by Wong et al., were used to further investigate complaint base rates and susceptibility to faking on standardized self-reported complaint inventories.

If it is accepted that measures of subjective complaint can be faked, this raises a question about how we can reduce the likelihood of this occurring. Application of the principles of deterrence theory suggests a possible solution may lie in the use of warnings that convey a threat that malingering may be detected, as a means of deterring individuals from exaggerating or falsely reporting symptoms. There have been few, if any, published studies exploring the effects of warnings on measures of subjective complaint in a neuropsychological context, although interestingly the use of warnings as a deterrent against malingering in other areas of psychology has been studied previously. One of the contexts in which warnings that faked performance may be detected has been investigated concerns the self-report of personal competencies or personality traits and is particularly relevant to the present study because of its focus on subjective experience.

For example, in a study investigating whether warnings might deter subjects from falsely reporting competencies, Braun and Faro (1968) found subjects distorted scores less when advised that certain features of the test were designed to detect faking. In this study, participants were allocated to a control group or one of three warning conditions, and asked to "fake-good" (i.e., imagine they were applying for a position as a sales-person and complete the test in such a way as to appear an excellent candidate for that position; Braun & Faro, 1968). The results of Braun and Faro's study suggest that warning subjects that fakers may be detected had a deterrent effect and reduced the extent of malingering behaviour. Similarly, in 1972, Nias found that by explicitly warning subjects about the "lie scale" in the Junior Eysenck Personality Inventory, the extent or quality of over-exaggeration and faking of positive characteristics was reduced, leading Nias to recommend that warnings may prove useful in practice settings.

In a neuropsychological context, there have been four recent publications exploring the effects of warning on tests of objective performance, such as memory (Johnson &

Lesniak-Karpiak, 1997; Slick, Hopp, Strauss, Hunter, & Pinch, 1994; Sullivan, Keane, & Deffenti, in press), intelligence (Johnson, Bellah, Dodge, Kelley, & Livingston, 1998), and motor skills (Johnson & Lesniak-Karpiak, 1997), and one report that has provided extended commentary on the ethics and appropriateness of warning against malingering (Youngjohn, Lees-Haley, & Binder, 1999). The results of the three empirical investigations on this issue have been mixed, although two of these reported a non-significant warning effect (Johnson et al., 1998; Sullivan et al., in press). The third study found that warning reduced malingering on some Wechsler Memory Scale-Revised indices (i.e., verbal memory, general memory and delayed recall) but not others, and did not alter performance on the Grooved Pegboard task (Johnson & Lesniak-Karpiak, 1997).

According to deterrence theory, warnings are most likely to be effective if they encourage individuals to undertake a cost-benefit analysis of the consequences of their action and assess the likelihood of specific consequences eventuating, before undertaking a behaviour, particularly anti-social behaviour (Evans, Neville, & Graham, 1990; Shore & Maguin, 1988; Smith & Felix, 1986; Varma & Doob, 1998). This "comparison-exercise" lies at the centre of deterrence theory, but its largely internal nature has hindered the collection of evidence that individuals do indeed conduct such comparisons, and as such, researchers have relied on post-test interviews to explore this idea. While findings on whether individuals actually engaged in cost-benefit analyses prior to engaging in behaviours such as drink-driving (Evans et al., 1990; Shore & Maguin, 1998), tax evasion (Varma & Doob, 1998), or crime (Smith & Felix, 1986) have been mixed, this research has clearly shown that costs and benefits can vary (i.e., these may include social, financial, or legal consequences).

In neuropsychology simulation studies, the importance of providing malingerers with information about the consequences of their action has been considered previously, largely because this has been seen as important to create "realistic" simulation conditions. However,

consideration of consequences of malingering has predominantly focussed on rewards (e.g., Nies & Sweet, 1994). Whilst this factor is important, there may be additional theoretical reasons derived from principles of deterrence theory why it is important to emphasise costs as well as potential rewards. Specifically, how are we presenting cost information to participants in simulation studies? Whilst some recent studies have attempted to convey costs information to analogue malingers (e.g., Horry & Shores, 1999), this avenue of research has yet to be fully explored. In this study, we aimed to encourage participants to engage in a cost-benefit analysis, by explicitly stating the major benefit they would gain from faking in a believable and undetectable manner (financial gain), as well as the major cost of being detected (prosecution for insurance fraud), to determine whether this might account for a significant warning effect.

Clearly, there are a number of important issues relating to use of self-reported complaint information in the context of neuropsychological assessments of malingering that have yet to be investigated, even though this area of research has been flagged as important, and in need of further investigation for some time (e.g., Loring, 1995). To begin to address some of these questions, the aims of this study were: first, to provide preliminary base rate data on self-reported complaint measures not investigated previously; second, to explore the vulnerability of these measures to faking; and third to examine the effect of warning against malingering on these tasks. Specific hypotheses were formulated for the second and third aims of this study. In relation to the second aim, it was predicted that the three self-reported complaint measures used in this study would be vulnerable to faking. That is, simulator-malingerers were expected to endorse more symptoms than controls, consistent with the findings of Wong et al. (1994). In relation to the third aim, if deterrence theory can explain a significant warning effect, we expected that warning malingerers about the possibility of

being detected (as well as informing them of the costs and benefits of faking) would reduce response distortion compared to unwarned malingerers.

Method

Participants

Responses to a number of self-reported symptom checklists were collected from fifty first-year undergraduate psychology students and ten first-year undergraduate business students enrolled at Queensland University of Technology. The average age of subjects was 25-years (SD = 8.87). Seventy percent of the sample was female. No significant difference between experimental groups was apparent for educational level (F (2,57) = 0.032, $p > 0.05$), age (F (2,57) = 1.865, $p > .05$), or gender (F (2,57) = 0.155, $p > 0.05$). To assess the extent to which participants understood instructions to malinger, a post-experimental questionnaire was administered, consistent with recommendations for analogue-design research (e.g., Nies & Sweet, 1994). No participants were excluded from analysis due to failure to understand task instructions.

Materials

Participants completed three self-reported complaint (SRC) questionnaires and one malingering test (Rey 15-Item Memory test; see Spreen & Strauss, 1998). The Rey 15-Item Memory test (also known as the Rey Memory Test, Lezak, 1995; and the 15-Item Test, Vickers et al., 2001) was included in the test battery as a check of the extent to which simulators "faked" responses during testing. The SRC tests used in this study were the Neuropsychological Symptom Checklist, the General Health Questionnaire-30, and the Depression, Anxiety, and Stress Scales. These measures are described briefly below.

The Neuropsychological Symptoms Checklist (NSC)

The NSC is a 93-item, self-administered screening instrument intended to assess the status of potential neurological and neuropsychological signs and symptoms (Psychological

Assessment Resources (PAR), 1983; Schinka, 1984). NSC items cover sensory and motor functions, medications, chemical exposure, history of family illness, as well as cognitive and emotional complaints frequently seen in cases of brain dysfunction (PAR, 1983). Respondents were required to read through a list of symptoms and circle relevant problems (PAR, 1983). The NSC was used in this study because it is purported to be used frequently in workers' compensation and personal-injury cases (PAR, 1983). In addition, although the psychometric properties of this instrument have yet to be extensively investigated, the NSC is thought to be a measure with clinical utility (Schinka, 1984).

The General Health Questionnaire-30 (GHQ-30)

The GHQ-30 is a 30-item, self-administered screening test designed to identify short-term changes in mental health (Goldberg & Williams, 1988). GHQ items are intended to assess the ability to carry out "normal" functions and identify changes that may indicate declining function (Goldberg & Williams, 1988). Responses are given on a four-point Likert scale ranging from "better than usual" to "much less usual" for most items, with higher scores indicating more severe symptoms. The GHQ-30 was included in this study because it is one of the most "popular" screening tests for psychiatric illness (Whittington & Huppert, 1998) and its widespread use underscores the importance of investigating it's vulnerability to malingering.

The Depression Anxiety Stress Scales (DASS) Questionnaire

The DASS is a 42-item, self-administered instrument designed to measure the three related negative emotional states of depression, anxiety, and stress (Lovibond & Lovibond, 1995). Participants were required to use a four-point Likert severity/frequency scale, ranging from "did not apply to me at all" to "applied to me very much or most of the time" to rate the extent to which they had experienced each symptom over the past week. DASS items are divided into three scale scores each containing 14-items, and scores for each scale were

calculated by summing responses to component items. Each scale has a minimum attainable score of 0 and a maximum score of 42, with higher scores indicating more severe symptoms. The DASS was used in this study because DASS scale scores have been shown to discriminate well between depression, anxiety, and stress, even though these three syndromes remain moderately highly correlated with each other (Lovibond & Lovibond, 1995). In addition, the DASS depression and anxiety sub-scales have been shown to correlate moderately well with the Beck Depression ($r = 0.74$) and Anxiety Inventories ($r = 0.81$; Lovibond & Lovibond, 1995), but was developed and normed specifically for use in Australia making it particularly appropriate for this study.

The Rey 15-Item Memory Test

The Rey 15-Item Memory Test (RIMT), developed by Rey in 1964 (Spreen & Strauss 1998), consists of 15-items arranged in three columns by five rows. Subjects are shown a card containing the 15-items for 10-seconds, the card is removed, and then subjects are asked to draw the items from memory. Scores on the RIMT range from a minimum of 0 to a maximum of 15, with lower scores indicating worse performance. In the instructions, the number "15" is stressed to make the test appear difficult. In reality, because this test is primarily a measure of immediate memory and attention, and because of item redundancy (i.e., ABC, 123, abc, etc.), the RIMT is actually rather easy and examinees need recall only three or four ideas to recall most items. Malingerers are thought to misjudge the difficulty of the task and thus perform more poorly than all but those with severe intellectual impairment do (Lezak, 1995). As noted previously, the RIMT was used in this study to determine the extent of faking by subjects in malingering conditions.

Procedure

Subjects were randomly assigned to one of three groups: control, malingerers-without-warning, or malingerers-with-warning. Prior to testing, participants in malingering

conditions were provided with a vignette instructing them to imagine they had been involved in a car accident, were seeking compensation, had decided to exaggerate the extent of their deficits, but were aware this would need to be in a believable manner so as not to arouse the examiner's suspicion. At this stage, participants were also instructed to peruse a list of symptoms commonly experienced following head injury. This list was shown to participants for three-minutes prior to testing to facilitate simulation. The list was withdrawn from participant's view before testing to prevent anchoring, however subjects were reminded to think back to the symptom list before the completion of each test to reinforce malingering instructions.

Participants in the malingerers-with-warning group received an additional instruction advising that some questionnaires may identify faking. Wording of this warning was constructed to reflect the possibility that malingering may be detected, taking into consideration recent comments by Youngjohn et al. (1999) that no procedure reliably detects malingering. An explicit statement of the consequences of faking being detected was included in the warning. That is, participants in the malingerers-with-warning group were instructed that the identification of faking would lead to prosecution for insurance fraud. Control subjects were issued with standard instructions for tasks.

All subjects were individually administered SRC questionnaires and the RIMT. To minimise order effects, participants completed SRC measures and the RIMT in a counterbalaced order to ensure there was an equal chance that a test was either done first, second, third, or fourth by each participant. At the completion of testing, participants in malingering conditions were asked two questions to determine the nature and extent to which simulators undertook cost-benefit analyses predicted by deterrence theory. First, participants were asked, if, when completing the questionnaires, they considered the costs/benefits involved and second, how they used this information during testing.

Results

To assess the extent of malingering induced by our simulation instructions and coaching we compared scores on the RIMT across groups. Using a one-way ANOVA with alpha set at 0.05, a significant group effect was found on the number of RIMT items correctly recalled, $F(2,57) = 25.67$, $p = .000$. Subjects in the control group recalled significantly more items ($M = 15$; $SD = 0$), than those in malingering conditions did (malingerers-with-warning, $M=5.82$; $SD = 4.65$ and malingerers $M=6$; $SD = 5.77$). This suggests our simulation instructions were effective and induced a change of behaviour among participants in malingering conditions and, on average, the magnitude of this change was sufficient to raise suspicion of malingering using standard and conservative cut-offs suggested for this purpose (e.g., cut-off of 7, Guilmette, Hart, Giuliano, & Leninger, 1994; Schretlen, Brandt, Krafft, & van Gorp, 1991; cut-off of 9, Bernard & Fowler, 1990 Is this true of the Bernard reference?; Goldberg & Miller, 1986; Hasker, King, Bloodworth, Spring, & Klebe, 1997; Lees, Loring, & Martin, 1992).

Analysis of Number and Severity of Symptoms Reported By Participants.

The mean, standard deviation, and group comparison statistics for all experimental measures are reported in Table 1. In terms of base rate data, inspection of descriptive statistics for control participants showed a relatively high degree of variation in responses, indicated by large standard deviations relative to the mean on all SRC measures.

Analysis of Warning Efficacy.

Group comparisons on total scores were conducted using a series of univariate ANOVAs to evaluate the effects of warning on symptom reporting. The independent variable, group membership, included three levels: control, malingerers, and malingerers-with-warning. The dependent variable for each ANOVA was the score on selected symptom inventories. Significant group differences were found for each SRC measure, and this pattern

of results is shown in Table 1. Follow-up analyses were conducted for each test, using Tukey HSD post-hoc comparisons to control for Type I error. Significant differences were found between control and malingering groups on each measure, with more symptoms or more severe problems being reported by malingering groups. No significant differences were found between the two malingering groups on any measure, although interestingly, there was a slight decrease in the number and severity of symptoms reported by participants in the malingering-with-warning group for two out of three SRC measures (see Table 1).

Insert table 1 about here

Analysis of Use of Schema and Cost Benefit Analyses

Participants in the two malingering groups were asked two questions to assess the extent to which they engaged in the comparison-exercise or cost-benefit analysis predicted by deterrence theory. The first question malingering participants were asked was "Did you consider the costs/benefits of malingering when completing the questionnaires"? The second question was: "How did you consider the costs/benefits in answering the questionnaires"?

In response to question one, seventy-two percent of participants in malingering conditions ($n = 43$) reported they had conducted a cost-benefit analysis and had used this information when making a decision as how best to malinger and avoid detection. To explore the relationship between group membership and reported use of cost-benefit analyses, Chi-square was calculated but revealed no significant relationship between these variables, $\chi^2 (1, N = 43) = 1.149$, $p = .347$. This suggests that warned malingerers were no more likely to report undertaking a cost-benefit analysis than unwarned malingerers.

In response to the second question regarding what strategies malingering participants used when faking tests, analysis revealed there was a number of common strategies used by

faking participants in both groups, including trying not to report extreme symptoms, or relying on personal knowledge and experience of head injury to determine faked behaviours. Figure 1 illustrates the range of strategies reported by participants in the two malingering groups and the percentage of individuals endorsing each strategy. Interestingly, as Figure 1 shows, none of the warned malingerers reported considering the consequences of being detected when trying to fake on tests, even though almost three quarters of those in this sample (72 %) said they had considered the "costs and benefits" in response to question one. Group comparisons were conducted using Chi-square to explore the relationship between group membership and strategy use, however no significant relationships were found for any variable. Specifically there was no relationship between group membership and reported use of strategies such as considering consequences of being detected, χ^2 (1, $\underline{N}$ = 43) = 2.197, $\underline{p}$ = .233, not endorsing extreme symptoms, χ^2 (1, $\underline{N}$ = 43) = 2.939, $\underline{p}$ = .175, feeling confident they could outsmart the system, χ^2 (1, $\underline{N}$ = 43) = 1.397, $\underline{p}$ = .491, or relying on personal knowledge or experience of mild head injury to determine performance, χ^2 (1, $\underline{N}$ = 43) = 2.667, $\underline{p}$ = .429. A similar number of people reported using no particular strategy when attempting to fake-bad on tests, χ^2 (1, $\underline{N}$ = 43) = 1.051, $\underline{p}$ = 1.00.

Insert figure 1 about here

Discussion

The aims of this study were threefold. First, to establish base rate data on the level of complaint reported on selected symptom inventories. Second, to investigate the extent to which these measures might be vulnerable to faking, given that the measures used in this study had not been investigated previously. The third aim of the study was to explore the

effects of the provision of a warning to deter malingering on a number of self-reported symptoms, and to maximise the likelihood of an effect, participants were specifically instructed about the costs and benefits of faking responses. Findings in relation to these three aims are discussed below.

Complaint Frequency (Base Rate Data) on Selected SRC Inventories

Base rate data on complaint frequency among control subjects in this study showed considerable variation however, as would be expected, scores were within the normal range on tests where normative data comparisons were possible (e.g., DASS). We suggest conservative application of the base rate information reported here to assist in the interpretation of scores on the NSC for which there was no previously published normative data (Schinka, 1984). In particular, we suggest scores that are more than two standard deviations above or below the mean reported in this paper be investigated further. Follow-up discussion with subjects who report complaints is the recommended method of interpreting NSC scores (PAR, 1983), however the addition of preliminary normative data on this test may provide a further indicator of possible over- or under- reporting of symptoms. This recommendation is made with the obvious, but important caveat that the validity of such normative comparisons will vary depending on how closely matched a particular client is to the subjects used in this study. In addition, if SRC measures are administered after open-ended questions in forensic settings, there may still be a need to interview clients to clarify SRC responses.

In terms of how simulator-malingerers perform on SRC measures used in this study, our results provide the first, albeit preliminary, indication of complaint frequency among analogue malingerers on the GHQ-30, NSC, and DASS. In this regard, our base rate data suggests that simulator-malingerers typically report between three and five times as many symptoms as non-malingerers on these tests. Symptom reports of this order of magnitude

may arouse suspicion of malingering, although these guidelines should be interpreted cautiously given the relatively small sample size and limited sampling strategy used in this study (i.e., non-patient sample who were reliant on coaching for their knowledge of head injury). As with most malingering "indices", scores in this range should probably be used to raise, or provide support for, a working hypothesis that the client may be malingering. Clearly, further studies using a wider range of samples are needed to investigate the generalisability of these results, particularly studies using clinical groups. On this point, it is interesting to note that a recent study showed that analogue malingerers were able to simulate postconcussive symptoms seen in mild head injury even though they failed to simulate deficits on objective performance tasks (Martin et al., 1996).

In addition, it should be noted that our complaint base rate data was derived from symptom assessments conducted using standardized SRC checklists and may not generalize to settings where less structured subjective complaint assessments are made. That is, it has been argued that use of symptom checklists per se, may increase the number of symptoms reported (e.g., Aubrey et al., 1988) and this argument has recently been reiterated sparking renewed debate on this issue (Sbordone et al., 2000; Wong et al., 1994). If this is the case, our base rate data might over-estimate the level of symptomatology that would be reported using less structured methods of assessment, however this is an empirical question that awaits further investigation.

There are two points that should be made about our use of standardized SRC measures that are relevant two this debate. First, the use of these measures was consistent across groups and therefore unlikely to affect between groups comparisons. Second, and perhaps most importantly, we considered it important to investigate the vulnerability of symptom assessments using SRC measures because these measures arguably offer significant advantages over less structured approaches to complaint assessment. For example,

standardized SRC measures ensure all clients consider the same set of symptoms and allow the psychometric properties of these tests to be determined. This may not be the case when "free" symptom description, as described by Sbordone et al. (2000), is the primary method of assessing patient complaint. Therefore, even if the use of SRC checklists "inflates" the rate at which symptoms are reported as has been suggested (e.g., Sbordone et al., 2000), as long as these tests are well validated, we would argue these measures produce more useful information than is likely to follow from a less systematic approach to symptom assessment, and that the value of this information is enhanced by the provision of base rate data of the type reported here.

Vulnerability of Selected Measures of Self-Reported Complaint to Malingering

The hypothesis that the three SRC measures used in this study would be vulnerable to faking was supported. Consistent with previous research (e.g., Wong et al., 1994), our findings suggest that subjects instructed to "fake-bad" reported experiencing a greater number or more severe symptoms than controls. That is, a wider range of standardised SRC checklists have now been shown to be vulnerable to faking than was previously the case. These findings underscore the need to reconsider how self-reported symptom information is used in neuropsychological assessments, whether this is to inform clinical practice decisions or as a source of information that is useful as an indicator of malingering per se. This does not mean that SRC data should not be collected and used for these purposes, merely that this data, like results from other neuropsychological tests, needs to be interpreted cautiously and with explicit acknowledgment that SRC data may be malingered. Further research is also clearly needed to investigate the relationship between SRC measures and other measures typically used in forensic settings, such as symptom validity tests.

For some clinicians, increasing scrutiny of patients' subjective complaints may be seen as compromising the therapist's role in providing support, empathy, and acceptance

(Williams, Lees-Haley, & Djanogly, 1999). However, we would argue that knowledge of the vulnerability of symptom report and, if possible, taking steps to minimize the likelihood of misinterpreting SRC data such as seeking corroborating evidence, is important, especially for clinicians working with potentially litigious clients. Indeed, although a matter of speculation, increased scrutiny of client's complaints may ultimately benefit them by ensuring more appropriate diagnosis and treatment, both for individuals who have exaggerated deficits and those with genuine head injuries.

Effect of Warning on Deterrence of Malingering Behaviour on Self-Reported Symptoms

Based on principles of deterrence theory, it was hypothesised that warning would have a deterrent effect on malingering, such that participants in the malingering-with-warning group would report fewer or less severe symptoms than unwarned malingerers, however this hypothesis was not supported. Specifically, the results of this study suggest that warning did not have a significant effect in deterring malingerers from faking responses on measures of self-reported complaint. The failure to find a significant deterrent effect of warning on SRC tasks used in neuropsychological settings is consistent with findings from the majority of studies conducted in this area (e.g., Johnson et al., 1998; Slick et al., 1994; Sullivan et al., (in press)), with the exception of one study where warnings were found to reduce malingering on selected tasks (Johnson & Lesniak-Karpiak, 1997). However, in other areas of psychology, for example, where subjects have been asked to report personal competencies, our results are not consistent with the literature, since there is some evidence that warnings deter subjects from reporting certain aspects of their subjective experience, especially when they have been instructed to "fake-good" (e.g., Braun & Faro, 1968; Nias, 1972). Our findings indicate that the effectiveness of warnings in deterring malingering behaviour may be restricted to a narrow range of testing instruments, abilities, or situations.

If warnings are effective only in "fake-good" situations, for example, it is important to consider why this might be so. One explanation might be that the attributes of warnings in "fake-good" situations are different from than those in other contexts making them more effective deterrents against malingering. If someone is tempted to exaggerate their strengths to get a job, for instance, warnings might work in this context because the costs of accepting a position on false grounds are perceived as high (i.e., there are potentially serious legal and social costs), and importantly, the likelihood of being detected may also be perceived as high, particularly if the candidate is ultimately appointed. If indeed, differences in warning attributes can account for the mixed pattern of results in the warning literature, it is important to consider how future studies might manipulate these attributes. One way of varying warning attributes might be to devise warnings that emphasise multiple costs and benefits of a particular course of action, including social, legal, and financial consequences, since this might convey a more realistic cost-benefit scenario than that used in this study, and provide a better test of warning efficacy.

Other warning attributes that have might have influenced warning efficacy relate to warning content and wording in terms of how consequences were conveyed, and also the way the warning was delivered (i.e., in written or verbal format). Perhaps, given principles of deterrence theory, the most promising avenue for future research relates to warning content and delivery. Conceptually, warning content, specifically the nature and manner in which costs and benefits are conveyed, would seem to be especially important in understanding how warnings might work to reduce malingering. As such, we recommend that future research using analogue-design studies explicitly state the costs and benefits of malingering to participants and vary the way this is done.

A related possible explanation for why we failed to find a significant warning effect concerns the realism of costs and benefits used in this study. Ideally, to improve the

generalisability of results from studies of this type, it is important that the costs and benefits participants are required to consider reflect those faced by would-be malingerers, so that participants can estimated the risk associated with these costs and benefits and the likelihood of those consequences occurring. In the current study participants were advised of a potential large settlement if the symptoms of mild brain injury could be effectively demonstrated. However, participants were drawn from an undergraduate student population and may not have assessed this consequence as plausible or likely. This may have reduced the incentive and motivation to effectively fake symptoms. Similarly the threat of punishment for insurance fraud may have had a limited deterrent effect on malingering behaviour if participants were aware that this threat would not eventuate for them personally. To address the problem of devising effective consequences, some researchers have used rewards and benefits that may be more likely to have direct and immediate relevance to student samples (e.g., listing the top ten fakers on student noticeboards; Horry & Shores, 1999), rather than attempting to simulate real-life conditions since this can be difficult (Smith & Berger, 1997). This balance between using consequences that are realistic but also meaningful to simulator-malingers has proved difficult to achieve in the context of choosing consequences for simulation studies and is a well-recognised limitation of analogue design malingering research generally (e.g., Nies & Sweet, 1994). We would recommend the use of post-experimental questionnaires to assess the perceived likelihood of consequences eventuating, as a way of monitoring responses to consequences used in malingering simulation research.

There are, however, several other possible explanations that could account for the inconsistent pattern of results apparent among "warning" studies, including differences related to test instruments or the ability being measured. Specifically, it may be that some tests or abilities may be more vulnerable to faking than others. Perhaps the types of questions asked on some tests, such as personality tests, are more easily feigned than questions on

symptom report inventories. This could be because there may be no clear right or wrong answer on personality tests, options for distorting scores may be perceived as more limited, stimulus items may require different levels of processing, or the format for administering tests (e.g., self-completion versus examiner-administered) may differentially influence faking behaviour. Further research is needed to explore some of these possibilities.

Use Of Cost-Benefit Analyses And Strategies For Faking

The failure of any participants in the malingerers-with-warning group to disclose that they thought about the consequences of malingering was contrary to expectations and possibly indicates that some malingerers adopted a less rational and calculating approach to their decision whether to malinger than we expected. Indeed, there is some support for this interpretation in the literature, since some studies have shown that even when individuals have costs and benefits to weigh up, including such serious costs as jail sentences, they do not always behave rationally, or at least, they do not report that they compared these consequences when questioned (Smith & Felix, 1986). As noted previously, the largely internal nature of the hypothesised comparison-exercise that individuals undertake, means that it is difficult to collect accurate reports about this, although it may be possible to improve the way this is done.

In this study, we asked individuals two questions about whether they conducted a cost-benefit analysis of the consequences of malingering and what strategies they used to "fake" responses. It should be pointed out that analyses conducted on this data were intended as exploratory, particularly since responses to strategy questions were elicited in an unstructured manner. That is, subjects volunteered faking strategies described in this study when we asked them what strategy they adopted. An interesting paradox arose here, in that most people in the warned malingering group (73%) reported engaging in a cost-benefit exercise, yet no-one in this group volunteered thinking about consequences as the strategy

they used to determine their faking behaviour. This finding is interesting for at least two reasons. First, focussing on the number of warned malingerers who reported they conducted a cost-benefit analysis (approximately three quarters of participants in this group), it is clear this number was not optimal. Future studies may need to consider how this percentage can be increased. For example, an alternate method of exploring whether cost-benefit analyses figure in decisions about malingering might be to devise a way to "force" individuals to undertake such analysis, as has been attempted in at least one other study (Varma & Doob, 1998). Varma and Doob asked subjects questions that required them to enunciate the costs and benefits of cheating the tax system to increase the likelihood they undertook the comparison-exercise, and future studies could include a similar set of questions prior to measuring "faking" on neuropsychological tasks.

The second reason why the lack of congruence between the number of warned malingerers who conducting a cost-benefit analysis and the number who considered the consequences of being detected is interesting, is because the lack of congruence between these two responses raises questions about possible limitations of the data collection method used here (i.e., relying on subjects to volunteer strategies without prompting). The use of a more structured approach to assess strategy use is recommended for future research. For example, participants could be asked to indicate which strategies they used to inform faking behaviour from a list of alternatives that could be derived in the first instance from the categories generated in this study. Such investigation may help investigate concerns raised by Youngjohn et al. (1999), that warned malingerers are likely to become more "sophisticated" fakers. Certainly, based on our preliminary data, initial indications are that warning did not significantly alter the way malingerers performed on our tests, although this finding must be regarded as tentative.

In addition, it remains to be determined whether genuine malingerers conduct the proposed comparison-exercise, and this is an area that requires future research. Retaining the use of post-experimental investigations to explore use of cost-benefit analyses and other faking strategies will be an important inclusion in future studies of this type.

A common criticism of analogue design malingering research is that strategies used to "induce" malingering may not be effective (Nies & Sweet, 1994). For example, subjects may not have sufficient knowledge to fake in the manner that is believable. In this study, strategies such as the use of a descriptive vignette and continuous prompts to refer to a symptom list were used to induce malingering. These strategies appear to have been effective since participants in both malingering conditions, performed worse than controls on all SRC measures as predicted, with participants in malingering groups typically reporting less than seven items on the Rey 15-Item Memory Test.

Finally, it is important to reflect on the broader implications of this research, particularly given that it coincides with what appears to be the re-emergence of a debate about the use SRC checklists in the assessment of malingering, as mentioned previously (Sbordone et al., 2000; Wong et al., 1994). Whether self-reported complaint measures should be used has become a somewhat contentious issue, perhaps as a consequence of increased interest in the extent to which these measures can be faked (e.g., Wong et al., 1994). For example, it has been suggested that the use of "self-report" symptom checklists may encourage symptom endorsement by triggering report of problems that would not otherwise have been reported (Aubrey et al., 1988; Sbordone et al., 2000; Wong et al., 1994). However, others have noted that the use of standardised symptom-report checklists probably provide a more reliable way of assessing subjective-complaint than less formal procedures (Schinka, 1984). Therefore careful use of these measures may be better than not using these measures at all, and more practical than other suggestions that have been made to address this issue,

such as developing standardised measures of SRC that do not prompt inaccurate or inappropriate symptom reports (Wong et al., 1994), since it is difficult to imagine how this could be done. On this basis we would encourage the cautious, but continued use of standardized SRC measures in neuropsychological assessments, including assessments of malingering.

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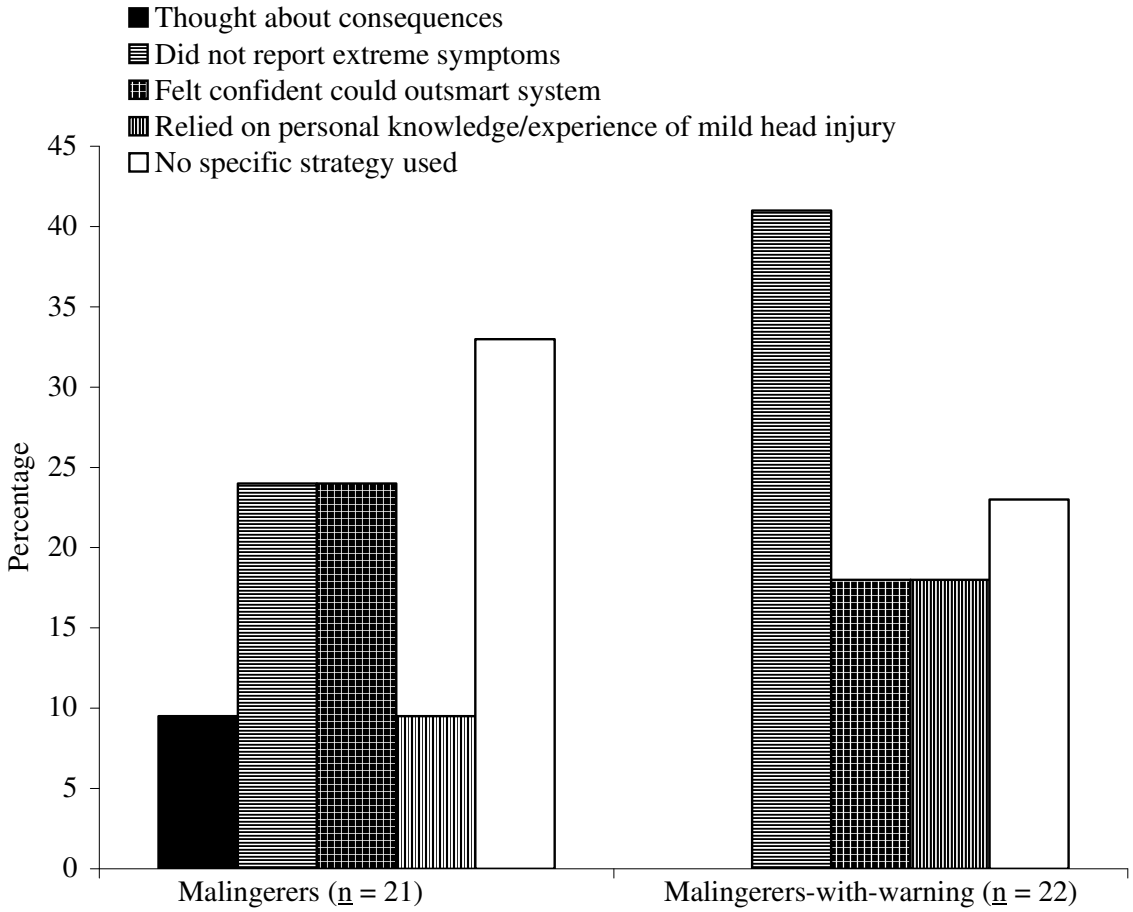
Table 1

Mean Scores, Standard Deviations, and Group Comparisons on All Experimental Measures. Results are shown for the Depression Anxiety Stress Scales (DASS), General Health Questionnaire-30 (GHQ-30), Neuropsychological Symptom Checklist (NSC), and related subscales.

	Control (n=17)		Malingerers (n=21)		Malingerers-with-Warning (n=22)		
Measure	M	SD	M	SD	M	SD	F
GHQ-30	18.65 [a]	9.03	66.29 [b]	11.68	69.00 [b]	13.50	106.44
NSC-Total	10.29 [a]	9.57	27.71 [b]	7.98	23.36 [b]	9.79	18.09
DASS-Total	14.00 [a]	11.98	74.00 [b]	24.85	65.86 [b]	24.88	39.97
DASS Stress	7.12 [a]	5.97	27.38 [b]	7.57	24.77 [b]	9.25	
DASS Anxiety	3.76 [a]	3.58	20.14 [b]	8.91	18.36 [b]	8.56	
DASS Depression	3.12 [a]	3.66	26.57 [b]	11.37	22.73 [b]	11.02	

Note. The M's of groups with different superscripts differed significantly ($p < 0.05$) on Tukey HSD analysis. All F statistics differed significantly ($p < 0.000$).

Figure 1. Percentage of Strategies Used in the Two Malingering Groups.


Thought about consequences
Did not report extreme symptoms
Felt confident could outsmart system
Relied on personal knowledge/experience of mild head injury
No specific strategy used
Percentage
45
40
35
30
25
20
15
10
5
0
Malingerers (n = 21)
Malingerers-with-warning (n = 22)